REMARKS

Claims 1-3 are presently pending in the application.

Claims 1 and 2 have been amended to that the viscosity index improver (c) comprises a "dispersion type- or non-dispersion type-polymethacrylate having a number average molecular weight of from 5,000 to 35,000," which is supported in the specification at least at page 20, lines 3-15. Additionally, claim 2 has been amended to recite that the %Cp of the base oil is from 73 to 82, which is supported at least at page 5, lines 20-23 and in Inventive Example 6 in Table 1 at page 26. Finally, claim 3 has been added, which recites that the %Cp of the lubricating oil is 71 or higher, which is supported at least at page 5, lines 20-22. No new matter has been added by these amendments, and entry is respectfully requested.

In the Office Action, the Examiner has again rejected claims 1 and 2 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,482,778 of Tersigni et al. ("Tersigni") in view of U.S. Patent Application Publication No. 2001/0044389 of Komiya et al. ("Komiya") for the reasons set forth previously. Since the Examiner's detailed arguments have been described in full on the record, they will only be summarized below.

Briefly, the Examiner argues that Tersigni teaches a transmission fluid composition comprised of a phosphorus-containing additive and a base oil with a kinematic viscosity of 3 to 8 centistokes at 100°C, as well as a viscosity index improver so that the kinematic viscosity of the composition is increased to at least 5.0 cSt at 100°C. The phosphorus content is allegedly 0.02 to 0.08 percent by mass. Finally, the Examiner argues that Tersigni teaches that antioxidants, including sulfurized phenolic antioxidants, are typically added to the composition in the amount of 0 to 1 mass percent. The Examiner acknowledges that Tersigni is silent as to the %Cp of the disclosed mineral oil.

However, the Examiner argues that Komiya discloses a lubricating composition for transmissions which contains mineral oil, such as paraffinic or naphthenic mineral oil with a kinematic viscosity of 1 to 4 mm^2/s. Additionally, the %Cp of the oil is allegedly 70 or higher as defined by ASTM D 3238. The Examiner takes the position that the transmission oils disclosed by Tersigni and Komiya both contain similar mineral oils, and would therefore display the same characteristics. Further, referring to Table 1 and paragraph [0013] of Komiya, the Examiner

argues that Komiya specifically uses mineral oil with a % Cp from 75 to 81 since such a base oil displays excellent low temperature fluidity. Therefore, the Examiner concludes that it would have been obvious to use a base mineral oil having a % Cp of 75-81 in the transmission oil of Tersigni because Komiya teaches that enhanced low temperature fluidity would result.

Applicants previously argued that the phosphorus content of the claimed composition is critical. In response, the Examiner argues that claims 1 and 2 teach phosphorus contents of 0.025 to 0.5 and 0.03 to 0.035 mass percent, respectively, whereas Tersigni teaches a composition comprising about 0.002 to 0.08 mass percent phosphorus. The Examiner acknowledges that criticality has been shown for less than 0.03 mass percent but not for more than 0.035 mass percent, such as the 0.04 mass percent taught by Tersigni. Additionally, the Examiner notes that Tersigni teaches "about" 0.02 mass %, which would allegedly encompass the claimed 0.03 mass%.

In response to Applicants' previous argument that the %Cp of the base oil is critical, the Examiner argues that the comparative data are not persuasive because they do not directly compare only compositions containing the claimed ranges of %Cp and compositions outside of those ranges. Further, Comparative Example 2 also allegedly has a sulfur content greater than the claimed range, and Comparative Example 5 allegedly has a viscosity and a sulfur content which are not within the claimed ranges.

Finally, Applicants previously argued that the sulfur content of the claimed composition is critical. In response, the Examiner argues that Tersigni discloses the total sulfur content of the composition derived from a specific sulfurized phenolic antioxidant which comprises 8.89 weight % of sulfur in the total compound, and that the antioxidant is present in the lubricating composition from 0 to 1 mass percent. Therefore, the Examiner concludes that the total sulfur content is from 0 to 0.089% which allegedly anticipates the claimed ranges.

Applicants respectfully traverse this rejection for the reasons set forth previously on the record, which Applicants rely upon in full, and for the additional reasons which follow.

As previously explained on the record, the purpose of the presently claimed invention is to provide a low viscosity transmission lubricating oil composition which can enhance fuel

efficiency and improve the durability of gears and the shifting properties of wet clutches, including long-lasting shifting properties. Applicants have developed the presently claimed composition with a low viscosity of 5.0 to 6.0 mm^2/s at 100° C and a sulfur content of not more than 0.15 percent by mass of the composition (0.05 to 0.14 % in a preferred embodiment). This composition is obtained by adding appropriate amounts of (B) a phosphorus compound in an amount of 0.025 to 0.05 mass % as P (0.03 to 0.035 % in a preferred embodiment) and (C) a viscosity index improver ("VII") comprising a dispersion type or non-dispersion type polymethacrylate (PMA) having a number average molecular weight of from 5,000 to 35,000 to (A) a specific mineral lubricating base oil having a kinematic viscosity of 2.3 to 3.4 mm^2/s at 100°C (2.5 to 3.3 in a preferred embodiment) and a %Cp of not less than 70 (73 to 82 in a preferred embodiment). The resulting composition is highly fuel efficient and capable of improving the durability of gears and the shifting properties of wet clutches.

Neither of the cited references teaches or suggests the claimed VII. Namely, Tersigni teaches the optional inclusion of a viscosity index improver (col. 6, line 55 through col. 7, line 29 and col. 12, lines 24-27) but is completely silent as to the molecular weight thereof, and does not teach or suggest the claimed polymethacrylate having a number average molecular weight of 5,000 to 35,000. Komiya generally teaches PMAs having a weight average molecular weight of 10,000 to 200,000 (paragraph [0039]) but exemplifies only PMAs having weight average molecular weights of 4,000 and 120,000 (paragraph [0104]), both of which are outside of the claimed range.

As shown in Table A, the claimed composition is significantly different from the compositions taught by Tersigni and Komiya.

Table A: Comparison of Claimed and Prior Art Compositions

	Claimed Composition	Tersigni Composition	Komiya Composition
(a) Base Oil			
kinematic viscosity at 100°C (mm^2/s)	2.3-3.4 (preferably 2.5-3.3)	3-8 (cSt)	1-10 (preferably 1-4)
%Cp (ASTM D 3238)	70 or higher (preferably 73-82)	silent	70 or higher (in Examples, 75-81)
(b) Phosphorus Compound			
Phosphorus content (mass %)	0.025 to 0.05 (preferably 0.03 to 0.035)	0.02 to 0.08	silent
(c) Viscosity Index Improver (PMA)			
Mw	5,000 – 35,000	silent	10,000 – 200,000 (in Examples, 40,000 – 120,000)
(d) Sulfur Content			
mass %	less than 0.15 (preferably 0.05 to 0.14)	0-1 (preferably 0 to 0.089) as antioxidants	silent

As previously argued, the %Cp of the base oil and the sulfur content in the composition are critical to providing the observed properties, such as durability to gears and favorable shifting properties of wet clutches. The criticalities of these components may be seen by considering Table 1 (Inventive Examples) and Table 2 (Comparative Examples) at pages 26-27 of the application. Specifically, the components in the composition of Comparative Example 1 are nearly equivalent to those in Inventive Examples 4 and 6 except for the %Cp of the base oil. The % Cp in the composition of Comparative Example 1 is 69%, outside of the claimed ranges, compared with %Cp values of 71% and 73% for Inventive Examples 4 and 6, respectively. The sulfur content in the composition of Comparative Example 1 is 0.14% by mass, which is only negligibly higher than that of the compositions in Inventive Examples 4 and 6 (0.13 mass%). Therefore, any differences in properties may be attributed to a difference in %Cp.

It can be seen from Tables 1 and 2 that the results of the SAE No. 2 Test for the composition of Inventive Examples 4 and 6 are superior to those of Comparative Example 1. As described at page 24, last line to page 25, line 7 of the specification, the difference between the dynamic friction coefficient after 500 cycles and that after 2,500 cycles must be 0.02 or less to provide excellent durability. In this case, the difference for Examples 4 and 6 is 0.01, compared with a difference of 0.03 for Comparative Example 1, an unacceptable result which would not provide excellent durability. Further, the composition of Inventive Example 6 exhibits a remarkably high value in the Last Non-Seizure Load Test (785 N), much larger than that of Comparative Example 1 (618 N), thus providing better extreme pressure properties. Therefore, Applicants submit that the criticality of the %Cp of the base oil recited in claims 1, 2, and 3 is indeed supported in the specification.

The criticality of the sulfur content is also important, which can be seen by comparing the compositions of Comparative Example 3 and Inventive Example 6. Specifically, the components in the composition of Comparative Example 3 are nearly equivalent to those of Inventive Example 6 except for the sulfur contents: the sulfur content in the comparative Example is 0.16 mass % (outside of the claimed range) and that of the Inventive Example is 0.13 mass % (as claimed). It can be seen from Table 2 that the results of the SAE No. 2 Test for the composition of Comparative Example 3 yield a difference if 0.03 , which is greater than the maximum allowable value of 0.02, and therefore not acceptable. In contrast, the result for Inventive Example 6, 0.01, is with the allowable range. Therefore, it is apparent that the criticality of the sulfur content in the composition is also supported in the original application.

In order to further demonstrate the criticalities of the phosphorus content and the molecular weight of PMA (viscosity index improver), Applicants have conducted additional comparative experiments. These experiments, described in the Declaration Under 37 C.F.R. 1.132 of Osamu Kurosawa ("Kurosawa Declaration"), enclosed herewith, demonstrate that compositions having phosphorus contents outside of the claimed range (0.025 to 0.05 mass %) or molecular weight of PMA outside the claimed range (5,000 to 35,000) do not exhibit satisfactory performances in the SAE No. 2 Test or the Last Non-Seizure Load Test.

As described in paragraph 6 of the Kurosawa Declaration, three new comparative (reference) compositions (Reference Examples 1-3) were prepared in the same manner as described in the application for Inventive Example 3 but including a different phosphorus

content (Reference Examples 1 and 2) or molecular weight of PMA (Reference Example 3), as shown in Table B of the Kurosawa Declaration. Specifically, Reference Examples 1 and 2 contained 0.04 and 0.06 mass % phosphorus, respectively, rather than 0.03 mass %, as in Inventive Example 3. Further. Reference Example 3 contained viscosity index improver C-2, having a molecular weight of 50,000, rather than one having a molecular weight of 20,000 as in Inventive Example 3.

The Reference Example compositions were subjected to the SAE No. 2 Test and Last Non-Seizure Load Test to evaluate their performance in terms of durability of shifting properties and extreme pressure properties, as described at page 23, line 19 through page 25, line 19 of the specification. The experimental results are shown in Table B, which also includes the results for Inventive Example 3 and Comparative Example 4 for comparison.

As shown in Table B of the Kurosawa Declaration, the compositions of Reference Examples 2 and 3 deteriorated in at least one performance evaluation (the SAE No. 2 Test and/or the Last Non-Seizure Load Test) when the phosphorus content or the Mw of the PMA was not within the claimed range. Specifically, as shown in Reference Example 1, when the phosphorus content was 0.04 mass % (within the range recited in claim 1 but not within the range recited in claim 2), the result of the SAE No. 2 Test (a difference of 0.02) was slightly inferior to that of Inventive Example 3 (a difference of 0.01), but still at an allowable level. However, as seen from Reference Example 2, when the phosphorus content was increased to 0.06 mass % (outside of the claimed range confirm), the result of the SAE No. 2 Test worsened to a difference of 0.03, greater than the maximum acceptable level of 0.02, described above. This reference composition thus did not exhibit acceptable durability in shifting properties.

Similarly, with respect to the molecular weight (Mw) of PMA, is can be seen that the composition of Reference Example 3 (having a MW of PMA of 50,000, outside of the claimed range), that the result of the Last Non-Seizure Load Test deteriorated to the unacceptable level of 490 N compared with that of the composition of Inventive Example 3, 618 N. The composition of Reference Example 3 thus exhibited poor performance in terms of extreme pressure properties.

In summary, as shown by Reference Examples 2 and 3 in particular, compositions which are not according to the presently claimed invention do not exhibit the required performance with respect to the durability of shifting properties or extreme pressure properties. Therefore, the

criticalities of both the phosphorus content and the MW of PMA (VII) have been clearly demonstrated by the Kurosawa Declaration. Further, the results described in the specification demonstrate the criticalities of the %Cp and the sulfur contents in the presently claimed compositions. These results would overcome any case of *prima facie* obviousness which were to be established by the Examiner based on the proposed combination of Tersigni and Komiya, and reconsideration and withdrawal of the § 103(a) rejection are respectfully requested.

In view of the preceding Amendment and Remarks, it is respectfully submitted that the pending claims are patentably distinct from the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

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